

Computer Graphics Design and the Means of Education in Maritime Safety Domain

Motto: "Everybody's attitude to the computer is a test, an answer to the question: How do you react to the new?"

Grigore Moisil (Moisil, 1971, p. 35)

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Abstract

For dissemination of knowledge on maritime safety culture and safety management to different actors and stakeholders in the maritime sector, a didactic design is required and must be developed. Using modern multimedia didactic tools, teachers can apply interactive scenario-based models. The experience-based learning can connect theory and practice. The students of maritime universities can be chosen as target groups and the didactic design can be adapted for them. Didactic design can be tested in a classroom, including later interaction and can be used for learning the topics on safety culture and safety management.

Key words: maritime safety culture, safety management, modern pedagogy, modern educational means, educational software.

J.E.L. Classification: C80, C88

1. Introduction

In an educational action about maritime safety culture and safety management, in terms of efficiency, we distinguish four major areas: the objective to be achieved, the content of ideas, the adopted strategy and the evaluation. The focus on just one or two of the four areas can not ensure the success of the educational act. Modern pedagogy proposes to organize the learning process in such a way that content and strategy issues are achieved according to objectives.

What safety culture means? International Maritime Organization (IMO) considers that: "An organization with a 'safety culture' is one that gives appropriate priority to safety and realizes that safety has to be managed like other areas of the business. The key to achieving that safety culture is in:

- Recognizing that accidents are preventable through following correct procedure and established best practice,
- Constantly thinking about safety, and
- Seeking continuous improvement." (IMO, 2017, p.1).

Specifying an objective in the operational term implies an immediate and appropriate setting of the didactic strategy, especially the methods to be used and the means of education (Cristea, 2011, p.152).

A very important and component part of the teaching strategy on maritime safety culture and safety management, are the means of education defined as a material, natural or intentional part that supports the achievement of the objectives of the training activity. The ensemble of material resources used in the educational process by educators aims at perceiving, understanding of knowledge, forming notions, fixing and consolidating information.

The usefulness of the educational means about maritime safety culture and safety management was determined by:

- a philosophical materialistic sensualistic conception, according to which the senses give value to the truth of our knowledge and nothing exists in intellect without first being in the senses;
- the need to understand the didactic message in all its complexity, so that the call to several analysts facilitates this;
- optimizing the educational process by its instrumentalization, i.e. by using technical materials of a didactic or non-didactic nature associated with some methods;

Didactic tools interpose between teacher and student, enhancing the instructive-educative capacity of the educator and facilitating the student 's learning activity. They redimension the relationship between the verbal and active-practical aspects of didactic activity and put students in contact with objects, phenomena, events, or processes difficult to be accessed with direct perception. Familiarize students with the handling of objects, requests and support thought processes, stimulate research, and positively affect students' imagination and creativity. Didactic tools do not oppose word and writing, but integrate with them.

The use of educational means (Kelemen, 2004, p 109) is based on some principles:

- combining oral comments and audio - visual elements in order to be better retained;
- the use of educational means allows faster assimilation and more intense activity;
- if the means are carefully chosen, they can create a self-training situation;
- some educational means allow the interdisciplinary approach of the respective issue, which has obvious formative valences on the students.

The means of education for maritime safety culture and safety management prove to be useful only if they are properly integrated into the training activity (Cristea, 2011, p.152), (Storo, 2013, p. 102), and only when a pedagogical purpose is intended. They have pedagogical functions that must be known by the teaching staff for their complete capitalization:

- the communication function shows the property of educational means to transmit information about objects, phenomena or processes studied; These include audio-video means or case studies;
- illustrative-demonstrative function aims at improving oral communication by presenting experiments, demonstrations, patterns of behavior;
- the formative-educational function aims at practicing the thinking operations, activating the attention and forming some professional skills; It facilitates independent activity by stimulating curiosity and interests;
- the stimulus function involves developing the motivation for the studied subjects; Some educational means can trigger strong impressions, states and emotional experiences, moments of good mood; It has been noticed that the audio-video means are best suited to this;
- the function of rationalizing the effort in the teaching-learning activity;
- the school performance evaluation function refers to the possibility of diagnosing and assessing students' progress by creating problem-situations, which test their ability to operate with learned notions, identifying, comparing or interpreting them.

The "dynamic" professor has the following traits:

- it projects its didactic activity based on objectives addressed to the student (which is the main subject of learning);

- is concerned about understanding the needs and psychological profile of the 21st century student;
- adapts his teaching to motivate them and teach them to learn, seek information, and learn to process those by themselves.

The Computer contribution in this process is to enable students to acquire knowledge and skills about maritime safety culture and safety management which allows them to adapt to the requirements of a society that is constantly transforming.

Students need to be prepared for changes, to welcome them with enthusiasm, not with fear and resilience. If students are trusted to change, they will feel the need to be trained as best as possible to deal with new types of professions.

The teacher lives himself in a changing society, in the first line of change, fortunately, so he/she will have to adapt, accommodate and improve continuously.

According to (De Landsheere *et al.*, 1990, p. 81), education must prevent blind uses of new informatics technologies in communication. The teacher also prevents the alienation of man, fights against the desire for constant entertainment, for unjustifiably fear of new informatics technologies in communication, while preventing the diminution of creative spirit.

The teacher is transforming from the transmitter of information (Oprea *et al.*, 2010, p. 51) to the facilitator of learning process. In such conditions the students retain:

- 10% of what they read;
- 20% of what they hear;
- 30% of what they see;
- 50% of what they hear and see;
- 70% of what they are talking to someone;
- 80% of what they experience;
- 95% of what they are teaching to others;

By using the computer in the learning process it can be obtained:

- Motivation;
- Attention;
- Access to informational resources outside the school;
- Facilitate the understanding of abstract concepts;
- Stimulate curiosity through research;
- Self-paced practice: recovery or performance;
- Develop creativity;
- Facilitate teamwork;

The use of computer-assisted training and educational software in class for maritime safety culture and safety management in alternation with active-participatory and traditional methods, we think it is the optimal solution at this time to determinate students to learn more efficient about the topics. As adjuvants we can mention using educational software; exploitation of educational resources on the Internet; multimedia presentations; using the educational platforms or creating educational software of its own design.

2. Educational Software

“Educational software is any software product in any format (exe or not) that can be used on any computer and represents a subject, theme, experiment, lesson, course, etc. being an alternative or the only solution to the traditional educational modules (table, chalk)” (Vlada, 2010, p. 123).

Taking into consideration that, we can mention:

- *Training software* which allow individual practice needed to be acquired for working algorithms, computational techniques, or the formation of specific skills. The student works at his/her own pace and receives continuous feed-back from the program by appreciation of the given answer/
- *Software for presenting new knowledge* - A teacher-to-student dialogue is created between the program and the student:

- *Tutorial dialogue*, if the interaction with the student is controlled by the computer;
- *Investigation dialogue* if the interaction is directed by the student; The student can return to the sections already traversed, respond to program stimuli, track the proposed examples and necessary explanations, and receive immediate feedback.
- *Simulation software*- allows controlled representation of a phenomenon through a model with analog behaviour; It is possible to change the values of some parameters to see how the behavior of the system changes; Playback is intuitive, the student can follow phenomena more difficult to describe by classical means;
- *Knowledge-testing Software* - There is a wide range of testing software, which differs through the way of assessing knowledge (immediately or not) through the typology of items, the purpose of testing, etc. They are appearing in the form of interactive testing, objective that avoids disturbing factors from the traditional assessment (halo effect, Pygmalion etc.)
- *Educational games* - Software in the form of a game which involves the student in the problem solving process. A symbolic framework is created in which the student becomes an active character who pursues educational purposes without realizing it. The formal textbooks are abandoned and, more often than not, the work tasks are deeply practical.

In Table 1 below are enlisted the related technologies, theoretical models and strategies that can be used successfully when teaching on maritime safety issues.

Table no. 1 - Integrating informatics applications in transport education Integrational Media

Integrating informatics applications - Integrational Media		
Related Technologies	Theoretical Model	Strategies
Authoring tools Educational software development applications (on the web or installed on their own computer) (e.g., Dreamweaver, Toolbook Authorware, EDU Integrator) Learning management Systems (e.g., Saba, Docent, THINQ TrainingServer, LearningSpace, TopClass, Blackboard, Moodle, Desire2Learn, Kannu)	-Development of educational products -Multimedia -Collaboration -Information -Computer -Technology mediated communication -Authentic activities -Guided Learning -Interactivity -The presentation of knowledge -Control of the student -Individual learning	-Brainstorming -Collaborative activities -Project-based activities -Group interaction -Online Testing -Negotiation, building knowledge, reflection -Autotest -Synthesis -Creation -Analysis

Source: Oprea et al., 2010, p.51

The specific qualities of educational software are the following:

- stimulating interest for the new;
- developing logical, divergent thinking;
- stimulating imagination
- real-time stimulation of a variety of phenomena and processes that would be difficult and costly to reproduce in class
- optimizing the teaching activity through the diversification and interactivity of the examples
- intellectual training through self-education

Integrating informatics applications are based on the development of web design tools (e.g. WebCT, LearningSpace, Blackboard) that attempt to combine elements of exploratory request and learning dialogue environment in a core course or “knowledge portal”.

Opportunities are provided to incorporate various training strategies using software features available in a beneficial design.

3. Conclusions

It is obvious that the design-teacher will need to carefully analyze the variety of technological tools in search of those media that intersect with a maritime safety discipline they teach to be appropriate for the intended purpose and the category of students they are addressing. When using an authoring tool, like Moodle (Manole *et al.*, 2016, p.23), or others, hypermedia and primary resources refers to those primary digital objects that can be used to develop an educational software.

Designing an educational software for maritime safety involves several stages that differ in the nature of the work of the groups of specialists involved in this process.

- the first stage is pedagogical design (educational design), when a certain educational strategy is defined and concretized;
- in the second phase, the computer/ graphic / interface, this strategy is transposed into a training program (educational software), having all the functional characteristics required by the pedagogical project;

As modern technological improvements reduce risk, the more important becomes the weakest link in the system - the human factor. For this to be improved, it must be considered an area on which industry should focus more so that best practices in risk management and a culture of safety become an important factor in the global fleet. So, the new multimedia simulation technologies will have a great impact on the education of students, and the teacher will have at hand tools that can express the pedagogical message clearer.

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